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EXAMINER	
TUROCY, DAVID P	

ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/690,704	SHTEIN ET AL.	
	Examiner	Art Unit	
	DAVID TUROCY	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 34-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20, 34-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/3/2008 has been entered.

Response to Amendment

2. Applicant's amendments, filed 12/3/2008, have been fully considered and entered by the examiner. The examiner also notes the supplemental amendments dated 2/3/2009 and 3/23/2009, each of which has been entered by the examiner. The current claims under review are claims 1-20 and 34-39 as filed 3/23/2009.

Response to Arguments

3. Applicant's arguments filed 12/3/2008, 2/3/2009, and 3/23/2009 have been fully considered but they are not persuasive.

The applicant's arguments regarding the Stein reference is unpersuasive. Specifically, while the Stein reference fails to explicitly disclose a dynamic pressure as claimed, the prior art teaches each and every process step as claimed and therefore the prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle, organic material through the nozzle, using the same carrier gas,

background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed. The applicant has not provide any factual evidence to support their position and thus the examiner maintains the above.

As for the argument regarding the Stein II reference, the applicant has argued that the mask can not be considered a nozzle, however, this is clearly not supported by any factual evidence. The mask as taught by Shtein II is functionally similar to that of a nozzle, i.e. it concentrates the flow of the gases into an area of the substrate. Therefore giving the terms their broadest reasonable interpretation, it is reasonable to interpret the mask as taught by Shtein in the OVPD process to read on the term nozzle in the claims as written. Since the applicant has provided no factual evidence to support their position that a mask can not provide

Specifically, while the Stein II reference fails to explicitly disclose a dynamic pressure as claimed, the prior art teaches each and every process step as claimed and therefore the prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle, organic material through the nozzle, using the same carrier gas, background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed. The applicant has not provide any factual evidence to support their position and thus the examiner maintains the above. Additionally, applicants specification factual statement supports the

examiners position, see 0042, which states, the dynamic pressure is higher then the background pressure as a result of the interaction of the jet and the background pressure. Therefore, the presence of the jet within the parameters as claimed and the background pressure within the parameters as claimed will necessarily result in the dynamic pressure as claimed, unless the applicant is performing other steps that are not specifically and presently claimed.

The applicants arguments against the two Stein references, stating that a theoretical system can not create a real physical system is unsupported by any factual evidence and thus this argument is moot. The examiner notes that the simulation assumes $du_z/dz=0$, however, notes that this assumption is merely for simplicity and therefore acknowledges that the change in velocity will not be zero and one of ordinary skill would comprehend such a distinction. Again the simulation approximates the flow field by neglecting the influence of the substrate in close proximity to the nozzle, however, the fact that the simulation neglects the effect does not remedy the issue that the effect takes place. The applicants are claiming the same process steps as discussed and evaluated in the prior art references and therefore the examiner maintains that the results obtained by the applicant are those as claimed unless the applicant is performing process steps that are not claimed. The applicant has not provided any factual evidence to support the position that one of ordinary skill in the art would not expect predictable results or can not obtain a physical system using the extensive and detailed discussion of the simulations.

The applicants arguments against the two Stein references, stating that a Stein references do not enable one of ordinary skill in the art is not supported by any factual evidence and thus this argument is moot. For substantially the same reasons as discussed immediately above, the examiner maintains that one of ordinary skill in the art could operate the simulation in physical form without undue experimentation. The applicants have not provided any evidence of undue experimentation and thus this argument is not persuasive.

The applicant has argued against the Stein feature, teaching that the reference discloses two different processes, OVJP and OVPD and argues that the office incorporates the features of both deposition techniques in the rejection which is impermissible because a process is anticipated only if they are taught in the same arrangement. However, the examiner disagrees. Specifically, the examiner notes that the process of OVPD and OVJP are substantially similar in function. Initially, the examiner notes that OVPD is a process that utilizes a mask, where the mask can broadly be considered a nozzle due to the aperture through which the gases travel. Additionally, the examiner notes that Shtein explicitly discloses that the process of OVJP modifies the OVPD process, see section VII. Specifically, Shtein discloses modifying the OVPD process by including a high velocity carrier gas. Therefore, the particulars of the OVJP is not entirely different from the particulars of the OVPD and the teachings of section VII are not taken alone without a reading of the reference as a whole.

The applicant argues that Shtein in section VII discloses that the nozzle dimensions are much greater then the gas mean free path due to the statement that well defined edges occur "even for s>> mfp." However the examiner notes that such is not a teaching that the nozzle dimensions are in fact much greater, but that the well defined edges occur even when s >> mfp. Taking the reference as a whole, rather then a teaching of section VII alone, the examiner notes that the reference explicitly discloses the aperture shape and opening with a dimension equal to the mfp as claimed. Therefore it is erroneous to assume that this is an explicit teaching that the nozzle shape is much greater then mfp.

Again the applicant argues that the mask is not a nozzle, however, there is nothing in the specification that sufficiently describes the metes and bounds of term nozzle to exclude an aperture through a plate, i.e. a mask. The mask as taught by Shtein is functionally similar to that of a nozzle, i.e. it concentrates the flow of the gases into an area of the substrate. Therefore giving the terms their broadest reasonable interpretation, it is reasonable to interpret the mask as taught by Shtein in the OVPD process to read on the term nozzle in the claims as written.

The applicant argues against the 35 USC 103(a) rejection of Shtein, stating that the process fails to disclose the pressure and nozzle dimensions as claimed. However, the examiner notes that Shtein, in section VII specifically discloses that deposition pressure, carrier velocity, and nozzle dimensions are carefully selected to provide the deposited film and therefore discloses that such are known result effective variables and therefore it would have been obvious to one skill in the art at the time of the invention

was made to determine the optimal value for the pressure, carrier velocity and nozzle used in the process of Stein, through routine experimentation, to deposit the desired film with the desired film qualities.

The applicant has argues against “Micron-scale patterning of organic thin films using organic vapor phase deposition”, stating that the examiners interpretation of a mask as a nozzle is erroneous because it is inconsistent with those skilled in the art and not consistent with the specification. Initially, the applicant cites the first Shtein reference stating that the reference discloses a nozzle replaces a mask. However, the applicant has provided no evidence as to the scope of the term nozzle. Additionally, the applicant has failed to provide evidence as to the showing of nozzle formed at page 12, OVJD for home office. This appears to be an explicit teaching of a nozzle formation.

In response to the applicant’s arguments with respect to OVJP and OVPD and the process of OVPD using a mask and OVJP using a nozzle, such is not showing of the scope of the term nozzle and the examiner notes that the claims fail to appreciate OVJP as a feature of the claimed invention.

The applicant has argued that the process as taught by Shtein and “Micron-scale patterning of organic thin films using organic vapor phase deposition" fails to disclose a guard flow, such an argument is persuasive and the 35 USC 102 rejections over claim 11 has been withdrawn.

The applicant has argued against the Schmidtt and Stein reference stating that the process of Schmidtt is directed to uniform blanket films and Shtein is directed to films that are pixels and thus the teachings can not be combined. Specifically, the

applicant cites figure 11 and accompanying text. However the rejection is based on the combination of references, and Shtein discloses pixel patterns are known in the art and such can be achieved by setting the nozzle dimensions equal to the gas mean free path. Therefore, taking the references collectively, it would have been obvious to have modified Schmitt to have deposited multiple pixel film as taught by Stein using mfp equal to a critical apparatus dimension because such would lead to predictable results.

All other applicants arguments not specifically addressed above are deemed moot because they are not supported by any factual evidence and thus are deemed mere attorney speculation or are directed to features that are not present in the claims as written and are therefore deemed not commensurate in scope with the claims.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-20 and 34-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims require that the region surrounding the nozzle and substrate has a dynamic pressure of at least 1 Torr greater than the background pressure; however, the examiner can not locate support for such a

limitation in the original disclosure. The examiner notes the statement that the dynamic pressure "may be higher than the ambient (or background) pressure P_L", see 0042, however, this does not sufficiently provide support for the currently amended claim because there is no disclosure of relative range or the entire range as claimed, i.e. a process as claimed where the dynamic pressure is larger than background pressure for the entire range as claimed, i.e. all possible dynamic pressures at least 1 Torr greater then the background pressure.

6. *If the applicant can provide appropriate support for the additional claim limitation, either implicit or implicit, the examiner will withdrawn this rejection.*

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 7, 8, 14, 15, 16, 17, 18, 34-39 are rejected under 35 U.S.C. 102(a) as being anticipated by Micropatterning of small molecular weight organic semiconductor thin films using organic vapor phase deposition by Shtein et al., hereafter Shtein alone or as evidenced by the applicants statement of facts.

Shtein discloses a method for forming a patterned film of OLED, including pixels, wherein the process includes mixing vapors of an organic material with a carrier gas

and introducing the carrier gas into the nozzle and ejecting the carrier gas and the organic material from the nozzle at a flow velocity or 10% of the thermal velocity of the carrier gas, in order to deposit the organic material on the substrate surface as pixels. Shtein discloses the background pressure of 0.1-10 torr, including forming using a vacuum (see entire reference, specifically VII page 4015). It is the examiners position that spraying in a 10 Torr pressure environment inherently results in a pressure between the substrate and the nozzle, applicants "dynamic pressure", as claimed. Shtein discloses the nozzle to substrate separation, aperture depth and size as about equal to the mean free math length (see figure 6).

Alternatively, the Stein reference fails to explicitly disclose a dynamic pressure1 Torr greater than background, however, the prior art teaches each and every process step as claimed and therefore the prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle, organic material through the nozzle, using the same carrier gas, background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed.

Additionally, applicants factual statement supports the examiners position, see 0042 of specification, which states, the dynamic pressure is higher then the background pressure as a result of the interaction of the jet and the background pressure. Therefore, the presence of the jet within the parameters as claimed and the background pressure within the parameters as claimed will necessarily result in the dynamic

pressure as claimed, unless the applicant is performing other steps that are not specifically and presently claimed.

9. Claims 1-3, 7, 8, 14, 15, 16, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Micron-scale patterning of organic thin films using organic vapor phase deposition by Shtein et al, hereinafter "Micron-scale patterning of organic thin films using organic vapor phase deposition" alone or as evidenced by the applicants statement of facts.

"Micron-scale patterning of organic thin films using organic vapor phase deposition" discloses a method for forming a patterned film of OLED, including pixels, wherein the process includes mixing vapors of an organic material with a carrier gas and introducing the carrier gas into the nozzle and ejecting the carrier gas and the organic material from the nozzle at a flow velocity or 10% of the thermal velocity of the carrier gas, in order to deposit the organic material on the substrate surface as pixels. "Micron-scale patterning of organic thin films using organic vapor phase deposition" discloses the background pressure of 1 to 100 torr, including forming using a vacuum. It is the examiners position that spraying in a 100 Torr pressure environment inherently results in a pressure between the substrate and the nozzle, applicants "dynamic pressure", as claimed. "Micron-scale patterning of organic thin films using organic vapor phase deposition" discloses the nozzle to substrate separation as about equal to the mean free math length (see page 9, graph showing pixel shape vs. mask-substrate separation).

In the case of “Micron-scale patterning of organic thin films using organic vapor phase deposition”, the examiner, broadly interpreting the term nozzle, maintains that the disclosed mask, in combination with the orifice therethrough can broadly be considered a nozzle. The application has failed to explicitly define the term nozzle and a reasonable interpretation of nozzle includes the structure as shown by “Micron-scale patterning of organic thin films using organic vapor phase deposition”. See also page 12, OVJD for home office, wherein a nozzle is formed.

While the “Micron-scale patterning of organic thin films using organic vapor phase deposition” reference fails to explicitly disclose a dynamic pressure as claimed, the prior art teaches each and every process step as claimed and therefore the prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle, organic material through the nozzle, using the same carrier gas, background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed. The applicant has not provide any factual evidence to support their position and thus the examiner maintains the above. Additionally, applicants specification factual statement supports the examiners position, see 0042, which states, the dynamic pressure is higher then the background pressure as a result of the interaction of the jet and the background pressure. Therefore, the presence of the jet within the parameters as claimed and the background pressure within the parameters as claimed will necessarily result in the dynamic pressure as

claimed, unless the applicant is performing other steps that are not specifically and presently claimed.

10. Claims 1-3, 10, 14-18, 20, and 34-35 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4788082 by Schmitt ("Schmitt") as evidenced by the applicants statement of fact.

Schmitt discloses a process for depositing a film using a carrier gas (Abstract). Schmitt also discloses ejecting a carrier gas, hydrogen or helium, where the flow velocity is on the order of the speed of sound of the carrier gas or about one kilometer per second, which is greater then 10% of the thermal velocity of the carrier gas (Column 19, lines 59-62). Schmitt discloses depositing organic molecules to form coatings, including polymeric coatings (Column 30, lines 21-38). Schmitt discloses depositing the organic material using an atmospheric background pressure, i.e. 760 Torr, which reads on the background pressures as claimed (Column 21, lines 31-47, Column 24, lines 49-64). Schmitt discloses a plurality of discrete films, see figure 12. Schmitt also discloses that though high vacuum systems are often complicated they are often utilized when depositing thin films (Column 1, line 66 – Column 2, line 3). Schmitt also discloses providing a depositing species with a molecular weight greater then the carrier gas (Column 11, lines 48-58).

While Schmitt fails to explicitly disclose a dynamic pressure as claimed, the prior art teaches each and every process step as claimed and therefore the prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle,

organic material through the nozzle, using the same carrier gas and organic material, background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed. The applicant has not provide any factual evidence to support their position and thus the examiner maintains the above. Additionally, applicants specification factual statement supports the examiners position, see 0042, which states, the dynamic pressure is higher then the background pressure as a result of the interaction of the jet and the background pressure. Therefore, the presence of the jet within the parameters as claimed and the background pressure within the parameters as claimed will necessarily result in the dynamic pressure as claimed, unless the applicant is performing other steps that are not specifically and presently claimed.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1-3, 7, 8, 14, 15, 16, 17, 18, 34-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shtein.

Claims 1-3, 7, 8, 11, 14, 15, 16, 17, and 18: While the examiner maintains the position as above, where Stein discloses a velocity of a carrier gas of 10% of the thermal velocity and pressure, it is the examiners position that the carrier velocity and the pressure are known result effective variable. If carrier velocity or pressure were to low or too high it would result in improper coating and film quality. Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the carrier velocity and pressure used in the process of Stein, through routine experimentation, to deposit the desired film with the desired film qualities.

Shtein discloses a method for forming a patterned film of OLED, including pixels, wherein the process includes mixing vapors of an organic material with a carrier gas and introducing the carrier gas into the nozzle and ejecting the carrier gas and the organic material from the nozzle at a flow velocity or 10% of the thermal velocity of the carrier gas, in order to deposit the organic material on the substrate surface as pixels. Shtein discloses the background pressure of 0.1-10 torr, including forming using a

vacuum (see entire reference, specifically VII page 4015). It is the examiners position that spraying in a 10 Torr pressure environment inherently results in a pressure between the substrate and the nozzle, applicants “dynamic pressure”, as claimed. Shtein discloses the nozzle to substrate separation, aperture depth and size as about equal to the mean free math length (see figure 6).

Specifically, while the Stein reference fails to explicitly disclose a dynamic pressure as claimed, the prior art teaches each and every process step as claimed and therefore the prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle, organic material through the nozzle, using the same carrier gas, background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed. The applicant has not provide any factual evidence to support their position and thus the examiner maintains the above. Alternatively, applicant’s specification factual statement supports the examiners position, see 0042, which states, the dynamic pressure is higher then the background pressure as a result of the interaction of the jet and the background pressure. Therefore, the presence of the jet within the parameters as claimed and the background pressure within the parameters as claimed will necessarily result in the dynamic pressure as claimed, unless the applicant is performing other steps that are not specifically and presently claimed.

Claim 34-35: These claims are rejected for the same reasons as set forth above.

Claims 36-37: Stein discloses pixel deposition.

Claims 38-39: Stein discloses nozzle dimensions as claimed. At the very least, taking the Stein disclosure in its entirety, one of ordinary skill in the art at the time of the invention would have been reasonably expected predictable results in providing a nozzle with the dimensions as claimed to deposit the film as claimed because the reference as a whole explicitly discusses the advantages of such.

14. Claims 1-3, 5, 7, 8, 10, 12, 14, 15, 16, 17, 18, 20, 34-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Micron-scale patterning of organic thin films using organic vapor phase deposition"

Claims 1-3, 7, 8, 11, 14, 15, 16, 17, and 18: While the examiner maintains the position as above, where "Micron-scale patterning of organic thin films using organic vapor phase deposition" discloses a velocity of a carrier gas of 10% of the thermal velocity and pressure, it is the examiners position that the carrier velocity and the pressure are known result effective variable. If carrier velocity or pressure were to low or too high it would result in improper coating and film quality. Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the carrier velocity and pressure used in the process of "Micron-scale patterning of organic thin films using organic vapor phase deposition", through routine experimentation, to deposit the desired film with the desired film qualities.

Specifically, while the "Micron-scale patterning of organic thin films using organic vapor phase deposition" reference fails to explicitly disclose a dynamic pressure as claimed, the prior art teaches each and every process step as claimed and therefore the

prior art must necessarily result in a dynamic pressure as claimed. The prior art discloses a nozzle, organic material through the nozzle, using the same carrier gas, background pressure, and carrier gas flow velocity and therefore the results, i.e. the dynamic pressure, must necessarily be that as claimed unless the applicant is performing other process steps that are not presently claimed. The applicant has not provide any factual evidence to support their position and thus the examiner maintains the above. Additionally, applicants specification factual statement supports the examiners position, see 0042, which states, the dynamic pressure is higher then the background pressure as a result of the interaction of the jet and the background pressure. Therefore, the presence of the jet within the parameters as claimed and the background pressure within the parameters as claimed will necessarily result in the dynamic pressure as claimed, unless the applicant is performing other steps that are not specifically and presently claimed.

Claims 5, 10, 12, 18: "Micron-scale patterning of organic thin films using organic vapor phase deposition" suggests OVJP for the home office and therefore it would have been obvious to one of ordinary skill in the art to have selected a background pressure of ambient or 760 torr because by doing so one would be able to provide OVJP to the home office without having to provide expensive vacuum systems.

Claim 34-35: These claims are rejected for the same reasons as set forth above.

Claims 36-37: "Micron-scale patterning of organic thin films using organic vapor phase deposition" discloses pixel deposition.

Claims 38-39: "Micron-scale patterning of organic thin films using organic vapor phase deposition" discloses nozzle dimensions as claimed. At the very least, taking the Stein disclosure in its entirety, one of ordinary skill in the art at the time of the invention would have been reasonably expected predictable results in providing a nozzle with the dimensions as claimed to deposit the film as claimed because the reference as a whole explicitly discusses the advantages of such.

15. Claims 4-5, 6, 9, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view of US Patent 6468605 by Shah et al. ("Shah").

Schmitt in view Stein and Stickney of teaches all the limitations of these claims as discussed above in the 35 USC 103 (a) rejection, however, Schmitt in view Stein and Stickney fails to teach providing a guard flow.

However, Shah teaches of a method for producing a high-speed jet of coating material and gaseous carrier gas (Abstract). Shah discloses providing a guard gas (24) from the nozzle surrounding the gaseous spray (Column 3, line 52-Column 4, line 6, Figure 1). Shah discloses the guard gas facilitates screening, directing, and shaping of the spray coating to provide the appropriate coating (Column 4, lines 1-2). Shah also discloses using a guard gas including argon and nitrogen (Column 4, lines 3-4). It is the examiners position that the guard gas flow, as disclosed by Shah, would inherently affect the "dynamic pressure" or the pressure between the nozzle and the substrate.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Schmitt in view Stein and Stickney to use the guard flow suggested by Shah to provide a desirable high speed spray coating because Schmitt in view Stein and Stickney teaches spraying, at high speeds, a coating material entrained in a carrier gas and Shah teaches providing a guard gas provides for shaping, directing, and screening of the coating material entrained in a carrier gas. Please note that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183).

Claim 9: Schmitt in view Stein and Stickney and further in view of Shah discloses using a guard gas, argon or nitrogen, which has a larger molecular weight then the carrier gas, hydrogen or helium.

16. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Shah and further in view of Kirk-Othmer Vacuum Technology "Kirk-Othmer".

Schmitt and Shah teaches all the limitations of these claims as discussed above in the 35 USC 103 (a) rejection, however, Schmitt and Shah fails to explicitly teach providing a pressure less then 0.1 Torr.

However, Kirk-Othmer, teaching of known uses of vacuum technology, discloses a high vacuum corresponds to a controlled vacuum system (Pg 750, last paragraph). In addition, Kirk-Othmer discloses using various pressures, including pressures less then 0.1 Torr, for various controlled vacuum processes (Table 1). Therefore it is the examiners position that the pressure within the vacuum is a result effective variable, which varies depending on the coating material and substrate.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal pressure within the vacuum chamber, including less then 0.1 Torr, to deposit a thin film as disclosed by Schmitt in view Shah, through routine experimentation, to provide the desired coating of a substrate under vacuum conditions.

17. Claims 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view of Shah and further in view of US Patent 5709906 by Bickford et al. ("Bickford").

Schmitt in view of Shah teach all the limitations of these claims as discussed in the 35 USC 103 (a) rejection above. In addition, Schmitt teaches purging the system using the inert carrier gas to remove any unwanted species in the system, which might have been there when left open to the ambient environment (Column 21, lines 31-40). However, Schmitt in view of Shah fails to teach using a glove box.

However, Bickford discloses using a chamber that either can be purged with an inert gas, using an inlet tube and one-way nozzle, or the operation can take place in a

glove box under an inert atmosphere (Column 8, lines 53-56). The examiner acknowledges Bickford is direct to electrochemically reducing organic compounds, however, Bickford is only utilized here to show that an inert glove box is a known substitute for purging a chamber prior using a carrier gas. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Schmitt in view Stein, Stickney and Shah to use the glove box with an inert gas atmosphere suggested by Bickford to provide a desirable inert atmosphere without unwanted species because Schmitt in view Stein, Stickney and Shah teaches purging the spray chamber with inert gas prior to applying the coating and Bickford teaches a glove box with an inert atmosphere is a known substitute for inert gas purge of a chamber.

18. Claims 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4788082 by Schmitt ("Schmitt") in view of Stein et al. and "Angular Distribution of Flow from Orifices and Tubes at High Knudsen Numbers" by Stickney et al, hereafter Stickney.

Schmitt discloses all that is taught above; however, Schmitt fails to disclose providing a nozzle diameter, nozzle length or a nozzle-to-substrate separation about equal to the gas mean free path length or the formation of a pattern film comprising pixels

However, Stein discloses all that is taught above, discloses OVJP is known and suitable in the art to provide pattern films, including pixels in electronic devices (page 4014). Stein discloses when the Knudsen number is 1, that is when a critical apparatus dimension (disclosed atleast as nozzle length or a nozzle-to-substrate separation) is equal to the gas mean free path, a pattern film using OVJP can be predictably formed (4007-4009). Therefore, taking the references collectively, it would have been obvious to have modified Schmitt to have deposited multiple pixel film as taught by Stein using mfp equal to a critical apparatus dimension because such would lead to predictable results. Additionally, Stickney, discloses the angular distribution of the flow through an orifice, when using vacuum technology, is directly related to the Knudsen number, which is defined as the mean free path / diameter of the orifice (Page 10). Stickney discloses the angular distribution of the flow through the orifice becomes increasingly narrow, i.e. more directed, and the center-line intensity increases (page 16). Therefore Stickney discloses the Knudsen number decreases to 1, the angular distribution narrows and the center line intensity increases. In addition, Stickney discloses angular distribution of the spray through a tubular member is a function of the length of the tube as well as the diameter of the tube (Page 16-18). Therefore Stickney clearly discloses the relationship between the orifice diameter and the mean free path of the gas is a result effective variable.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the Knudsen number, including a Knudsen number about 1, used in the process of Schmitt in view of Shtein, through

routine experimentation, to provide a spray through an orifice, when using vacuum technology, with the desired angular distribution.

19. Claims 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4788082 by Schmitt ("Schmitt") in view of Shah as applied to claim 11 above and further in view of Stein et al. and "Angular Distribution of Flow from Orifices and Tubes at High Knudsen Numbers" by Stickney et al, hereafter Stickney.

Schmitt in view of Shah discloses all that is taught above; however, Schmitt fails to disclose providing a nozzle diameter, nozzle length or a nozzle-to-substrate separation about equal to the gas mean free path length or the formation of a pattern film comprising pixels

However, Stein discloses all that is taught above, discloses OVJP is known and suitable in the art to provide pattern films, including pixels in electronic devices (page 4014). Stein discloses when the Knudsen number is 1, that is when a critical apparatus dimension (disclosed atleast as nozzle length or a nozzle-to-substrate separation) is equal to the gas mean free path, a pattern film using OVJP can be predictably formed (4007-4009). Therefore, taking the references collectively, it would have been obvious to have modified Schmitt in view of Shah to have deposited multiple pixel film as taught by Stein using mfp equal to a critical apparatus dimension because such would lead to predictable results. Additionally, Stickney, discloses the angular distribution of the flow through an orifice, when using vacuum technology, is directly related to the Knudsen number, which is defined as the mean free path / diameter of the orifice (Page 10).

Stickney discloses the angular distribution of the flow through the orifice becomes increasingly narrow, i.e. more directed, and the center-line intensity increases (page 16). Therefore Stickney discloses the Knudsen number decreases to 1, the angular distribution narrows and the center line intensity increases. In addition, Stickney discloses angular distribution of the spray through a tubular member is a function of the length of the tube as well as the diameter of the tube (Page 16-18). Therefore Stickney clearly discloses the relationship between the orifice diameter and the mean free path of the gas is a result effective variable.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the Knudsen number, including a Knudsen number about 1, used in the process of Schmitt in view of Shah and Shtein, through routine experimentation, to provide a spray through an orifice, when using vacuum technology, with the desired angular distribution.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID TUROCY whose telephone number is (571)272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/David Turocy/

Patent Examiner, Art Unit 1792